⚠ **ALLIED** Engineered
Materials

DATE: January 30, 1989

SUBJECT: Norplex/Oak - John St. Plant
Dispersion Modeling - SARA Routine Reportable Emissions

TO: D. L. Hawkins

Air dispersion modeling studies have been completed for the Norplex/Oak - John St. facility for SARA routine reportable emissions of toluene and xylene. The model methodology and general setup is described in Attachment 1. The analysis is based on the following reported quantities:

|  | Point Source lbs/hr | Fugitives lbs/hr |
|---|---|---|
| Toluene | 80,000 | 3,000 |
| Xylene | 42,000 | 2,000 |

For this modeling study the following describes specific points of interest unique to this site.

- The main process and warehouse building was determined to be a source of downwash influence on the point sources considered.

- All emissions were normalized to an 8,000 hr. per year operating factor since the model requires an average emission rate.

- The fugitive emissions are treated as a three-dimensional volume source to allow for their distributed locations.

- In addition to the Cartesian receptor grid established, a series of discreet receptors was also investigated along the plant fenceline.

The analysis indicates that the maximum off-site ground level concentrations occur beyond the plant fenceline. Based on the analysis conducted, the maximum off-site annual average concentration is calculated to be essentially due north with the following values: 25.8 $\mu$g/cu. meter for xylene and 46.3 $\mu$g/cu. meter for toluene.

Per your request this memo has been directed to your attention. I assume copies will be provided to the John St. facility under your cover.

W. J. Hague

WJH:dh

cc: J. E. Cooper - MEY-4
    Route:AFM/WJH-File

# Appendix 1

Dispersion Modeling Methodology
SARA Reporting:  Impact Screening Analysis

**Re:**  Norplex/Oak - John Street Facility (Toluene & Xylene Emissions)


The model selected for performing the impact screening analysis for emissions
associated with SARA reporting is the Industrial Source Complex Long Term
(ISCLT) model.  The model calculates annual average concentrations at either a
user defined receptor grid array or at a series of discrete receptors.  The
ISCLT model is listed in the USEPA's Guideline on Air Quality Models - July 1986
(EPA-450/2-78-027R) as a preferred model for estimating impacts for point, area
and volume sources.  The model has several flexibilities in terms of run time
options.

The model utilizes a Gaussian formulation to describe pollutant transport and
diffusion processes.  The model uses the sector-averaged concepts originally
developed for the Air Quality Display and Climatological Dispersion models.  The
program uses statistical summaries of wind direction, wind speed and stability
class to establish long-term concentration profiles.

Specific to the air dispersion modeling studies being conducted for the SARA
reportable routine emissions, the following summarizes the overall model
configuration and option parameters:

o    A cartesian coordinate receptor grid is utilized for estimating impacts
     beyond the plant boundary.  The receptors are placed on a 20 meter
     increment spacing.

o    The regulatory default option is selected.  This directs the model to
     include final plume rise analysis, stack tip downwash, buoyancy-induced
     dispersion, default wind profile constants and vertical temperature
     gradients in the atmosphere.

o    Building downwash effects are simulated using techniques as developed
     by Huber and Snyder and discussed in EPA's Guideline for Determination
     of Good Engineering Practice Stack Height.

o    Meteorological data in a joint frequency format for a six stability
     class array is utilized.

o    Terrain effects are not considered, hence the model assumes a zero base
     elevation for all receptors.

o    Equations to describe momentum and buoyancy-related plume rise as
     developed by USEPA are utilized.

o Program has been set with the following input parameters defined:

   **Run Simulation**  : Rural mode

   **Meteorological**  : Albany, NY, 1960 thru 1964

   **Grid Dimensions**  : 0.40 kilometers: west ——> east
            0.40 kilometers: south ——> north

   **Origin**  : Center - Main Building

   **Output Units**  : micrograms/cu. meter

   **Mixing Heights**  : 1400 meters - (Mean Afternoon Height)

   **Ambient Temperature** : 57.7°F - Mean Daily Maximum
            47.3°F - Mean Daily
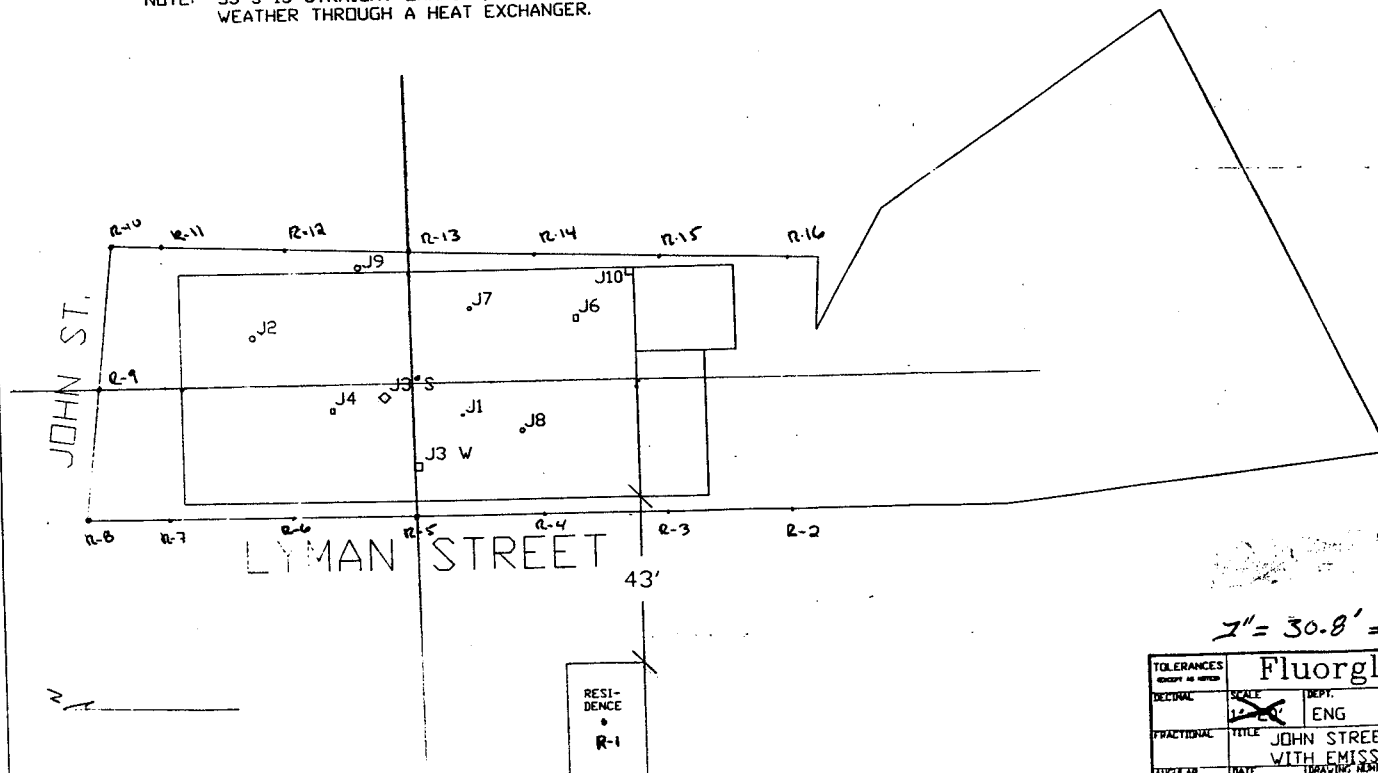            37.0°F - Mean Daily Minimum

This program is classified as a second level screening analysis in terms of model refinement. A more rigorous analysis would need to include terrain elevations, direction specific downwash analysis and hourly meteorological data profiles. This level analysis is intended as a cost effective technique to screen impacts.

W. J. Hague
Allied Signal
EMS - Engineering Department

| NO. | SIZE | ELEV. | USED ON | EMISSION #/HOUR |
|-----|------|-------|---------|-----------------|
| J1 | 5.25' x 8.25' | 41' | ADHESIVE OVEN | TOLUENE=4 / M-XYLENE=2.1 |
| J2 | 18" DIA. | 59' | ADHESIVE OVEN | TOLUENE=8 / M-XYLENE=4.2 |
| J3S | 24' x 24' | 38' | #2 OVEN HOOD WARM WEATHER | |
| J3W | 24' x 24' | 43' | #2 OVEN HOOD COLD WEATHER | |
| J4 | 12' x 16' | 42' | ADHESIVE COATER | TOLUENE=4 / M-XYLENE=2.1 |
| J6 | 14' x 20' | 49' | #8 ELECTRIC YARN OVEN | |
| J7 | 12" DIA. | 42' | #4 OVEN HOOD | |
| J8 | 14" DIA. | 40' | #6 GAS YARN OVEN | |
| J9 | 18" DIA. | 42' | ADHESIVE OVEN | TOLUENE=8 / M-XYLENE=4.2 |
| J10 | 24' x 24' | 50' | BOILER EXHAUST | |

NOTE: J3 S IS STRAIGHT EXHAUST, AND J3 W IS USED IN COLD WEATHER THROUGH A HEAT EXCHANGER.

JOHN ST.

R-10 R-11 R-12 R-13 R-14 R-15 R-16

J9
J10
J2    J7    J6
R-9
J4  J3 S    J1   J8
J3 W

R-8  R-7  R-6  R-5  R-4  R-3  R-2

LYMAN STREET

43'

RESI-
DENCE
•
R-1

1" = 30.8' = 9.4m

| TOLERANCES | Fluorglas | △ lied Signal |
|------------|-----------|---------------|
| DECIMAL | SCALE | DEPT. ENG | DRAWN BY E. YANKUS |
| | | | APPROVED BY |
| FRACTIONAL | TITLE JOHN STREET PROPERTY WITH EMISSION POINTS | |
| ANGULAR | DATE 10/88 | DRAWING NUMBER C-1325 |
| | FILE JOHNST | FLOPPY DWG #001 |

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